

The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* PHILIP VINOD, SEAL SUDIPTA,  
FEI WEIFENG and SHUKLA SATYAJIT

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Appeal 2007-1177  
Application 10/733,740  
Technology Center 1700

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Decided: May 16, 2007

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Before EDWARD C. KIMLIN, CHARLES F. WARREN, and  
CATHERINE Q. TIMM, *Administrative Patent Judges*.

KIMLIN, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 1-23, 25, and 26.  
Claims 1 and 5 are illustrative:

1. A method of applying a zirconia-based porous thermal barrier coating, the method comprising:

selecting a composite powder comprising an unbound homogeneous mixture of a first constituent comprising stabilized zirconia particles and a

second constituent comprising particles of a ceramic material having a melting temperature sufficiently low so that the second constituent particles at least partially melt when applied with a low velocity oxygen fuel process; and

using the low velocity oxygen fuel process to apply the composite powder and apply the porous thermal barrier coating to a surface.

5. A method of applying a zirconia-based thermal barrier coating, the method comprising:

selecting a composite powder comprising a first constituent comprising zirconia particles and a second constituent comprising particles of a ceramic material having a melting temperature sufficiently low so that the second constituent particles at least partially melt when applied with a low velocity oxygen fuel process; and

using the low velocity oxygen fuel process to apply the composite powder to a surface;

further comprising applying the composite powder to the surface of a component without removing the component from a machine of which it forms a part.

The Examiner relies upon the following references as evidence of obviousness:

Longo (Longo '343)	US 3,607,343	Sep. 21, 1971
Longo (Longo '184)	US 4,450,184	May 22, 1984
Spitsberg	US 2003/0027012 A1	Feb. 6, 2003
Sakakibara (JP '615)	JP 2002-0275615	Sep. 25, 2002
Nagaraj	US 2005/0191516 A1	Sep. 1, 2005

Appellants' claimed invention is directed to a method of applying a zirconia-based porous thermal barrier coating using a low velocity oxygen

fuel process. A composite powder comprising a homogeneous mixture of zirconia particles and a ceramic material is applied by the low velocity oxygen fuel process. The ceramic material has a melting temperature sufficiently low so that it at least partially melts when applied.

Appealed claims 1-4, 6-12, 22, 23, 25, and 26 stand rejected under 35 U.S.C. § 112, first paragraph, description requirement. In addition, the appealed claims stand rejected under 35 U.S.C. § 103(a) as follows:

- (a) claims 5 and 13 over Longo '184 in view of Nagaraj;
- (b) claims 5 and 13 over Longo '343 in view of Nagaraj;
- (c) claims 14, 15, and 17-19 over Longo '184 or Longo '343 in view of Nagaraj and JP '615; and
- (d) claims 16, 20, and 21 over Longo '184 or Longo '343 in view of Nagaraj further in view of Spitsberg.

We have thoroughly reviewed each of Appellants' arguments for patentability. However, we find that the Examiner's rejections are well founded and in accord with current patent jurisprudence. Accordingly, we will sustain the Examiner's rejections for essentially those reasons expressed in the Answer, and we add the following primarily for emphasis.

We consider first the Examiner's rejection of claims 1-4, 6-12, 22, 23, 25, and 26 under § 112, first paragraph, description requirement. It is the Examiner's position that the claim recitation "unbound homogeneous mixture" of the first and second constituents does not find original

descriptive support in Appellants' Specification. Appellants' arguments to the contrary notwithstanding, we agree with this assessment.

Initially, we note that there is no dispute that the original Specification provides no *ipsis verbis* disclosure of "an unbound homogeneous mixture" of the first and second constituents. Consequently, once the Examiner sets forth a reasonable basis why the Specification does not describe the concept embodied by the new claim language, it is Appellants' burden to establish that one of ordinary skill in the art would understand the original Specification to reasonably convey the concept of an unbound homogeneous mixture of the two constituents.

We do not disagree with Appellants' statement that "the term 'unbound' means that the constituents are not held in physical combination" (principal Br. 6, last sentence), and Appellants' reference the Specification disclosure at page 4, lines 7-9 which reads "[t]he two constituents are mixed together to form a homogenous mixture prior to spraying, such as by ball milling or by wet chemical mixing" (principal Br. 7, third para.). However, Appellants have not factually supported their contention that one of ordinary skill in the art would readily understand that the constituents are unbound after such processing. There is no evidence of record that ball mixing and wet chemical mixing of the claimed constituents result in a composition, especially a homogenous one, whose constituents are not held or bound together to some degree. Certainly, it is reasonable to presume that the claimed constituents are held together, or bound, in composition by the

liquid component of the chemical mixing, or that the ball mixing produces constituents that are physically held, or bound, together to some extent. Also, even accepting Appellants' argument that they had possession of the knowledge that powder constituents can be unbound during ball mixing and wet chemical mixing, there is no factual basis for concluding that the original specification reasonably conveys the concept that the first and second constituents are completely unbound during application. Also, although Appellants assert that they unquestionably appreciated that the claimed process of application binds the mixed powder into positively linked constituents, this does not establish that the constituents in homogenous composition are not bound to some degree after mixing and before application.

We next consider the § 103 rejection of claims 5 and 13 over Longo '184 in view of Nagaraj. Appellants do not dispute the Examiner's factual determination that Longo '184 discloses applying a zirconia-based thermal barrier coating by flame spraying a composite powder that may comprise zirconia particles and a ceramic material, such as Appellants' titanium oxide or cerium oxide. Also, Appellants have not refuted the Examiner's finding that the flame spray process of Longo '184 is equivalent to the claimed, but undefined, low velocity oxygen fuel process. Longo '184 does not expressly teach that the application process at least partially melts the titanium/cerium oxide particles, but Appellants have not challenged the Examiner's rationale that the reference's softening of these zirconia particles

would also at least partially melt titanium oxide and cerium oxide particles. While the Examiner recognizes that Longo '184 does not disclose applying the thermal barrier coating to repair a component while it is in the machine, we fully concur with the Examiner that Nagaraj evidences the obviousness of doing so. Nagaraj teaches that it was known in the art to repair a zirconia-based thermal barrier coating while the damaged component is in the machine.

Appellants contend that Longo '184 discloses that the inventive ceramic powder may comprise one or more of a laundry list of constituents, "some of which meet Applicants' first constituent claim limitation and some which meet Applicants' second constituent claim limitation" (Br. 8, penultimate para.). However, as explained by the Examiner, Longo '184 **exemplifies** and claims powder compositions comprising zirconium oxide and expressly discloses that the second material of the mixture can be Appellants' cerium oxide and titanium oxide. Accordingly, we concur with the Examiner that Longo '184 establishes the obviousness of utilizing a powder mixture comprising zirconia and Appellants' ceramic material. Also, we concur with the Examiner that Appellants have provided no factual basis for their argument that selecting the claimed second constituent which at least partially melts when applied "would not provide the relatively high temperature resistance that Longo '184 seeks" (principal Br. 9, first para.). This argument is rebutted by the specific reference disclosure of ceramic materials used by Appellants, namely, cerium oxide and titanium oxide. It is

not necessary for a finding of obviousness that all the compositions disclosed by Longo '184 meet the claimed requirements.

Turning to the § 103 rejection of claims 5 and 13 over Longo '343 in view of Nagaraj, the issues briefed by Appellants and the Examiner are essentially the same as those discussed above. As for Appellants' argument that "dependent claim 23 recites that the thermal barrier coating is porous" (principal Br. 10, fourth para.), the Examiner notes that claim 23 is not rejected over Longo '343.

We further note that Appellants do not present additional substantive arguments for the separate § 103 rejections of claims 14, 15, 17 and 19, or claims 16, 20 and 21.

As a final point, we note that Appellants base no argument upon objective evidence of nonobviousness, such as unexpected results, which would serve to rebut the inference of obviousness established by the applied prior art.

In conclusion, based on the foregoing and the reasons well stated by the Examiner, the Examiner's decision rejecting the appealed claims is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv) (2006).

AFFIRMED

Appeal 2007-1177  
Application 10/733,740

Siemens Corporation  
Intellectual Property Department  
170 Wood Avenue South  
Iselin, NJ 08830